

MSD150N60

N-Channel 150-V (D-S) MOSFET

Description

The device is using trench DMOS technology. This advanced technology has been especially tailored to minimize $R_{DS(ON)}$, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- $R_{DS(ON)} = 60\text{m}\Omega$ @ $V_{GS} = 10\text{V}$
- Fast switching
- Improve dv/dt Capability
- 100% EAS Guaranteed
- Green Device Available

Typical Applications

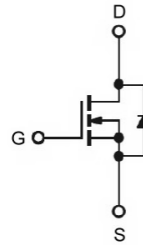
- Power Management in TV Converter
- Automotive Systems
- White LED boost converters
- DC/DC Converter

Package type : TO-252

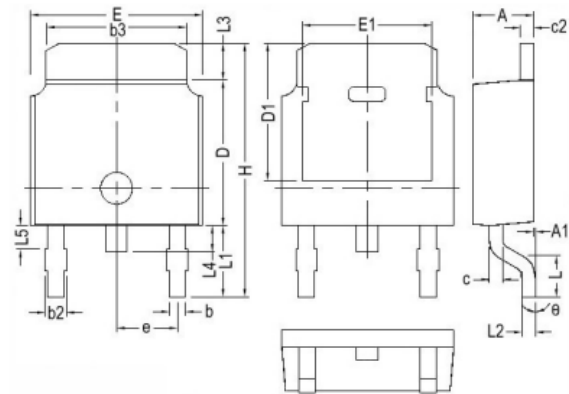
Packing & Order Information

3,000/Reel

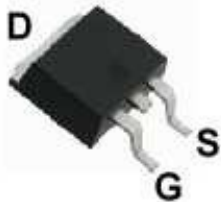
Graphic Symbol



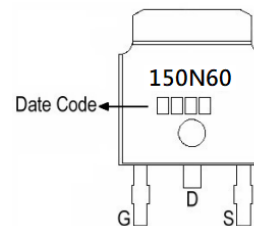
Package Dimension



REF.	Millimeter			REF.	Millimeter		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	2.20	2.30	2.38	E1	4.40	-	-
A1	0	-	0.127	e	2.286 BSC		
b	0.64	0.76	0.88	H	9.40	10.00	10.40
b2	0.77	0.84	1.14	L	1.40	1.52	1.77
b3	5.21	5.34	5.46	L1	2.743 Ref.		
c	0.45	0.50	0.60	L2	0.508 BSC		
c2	0.45	0.50	0.58	L3	0.89	-	1.27
D	6.00	6.10	6.223	L4	0.64	-	1.01
D1	5.21	-	-	L5	-	-	-
E	6.40	6.60	6.731	theta	0°	-	10°



Marking



RoHS Compliant

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings			
Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹ ($T_C = 25^\circ\text{C}$)	23	A
	Continuous Drain Current ¹ ($T_C = 100^\circ\text{C}$)	16	A
I_{DM}	Pulsed Drain Current ^{1,2}	60	A
I_{AS}	Single Pulse Avalanche Current, $L = 0.1\text{mH}^3$	18	A
E_{AS}	Single Pulse Avalanche Energy, $L = 0.1\text{mH}^3$	16.2	mJ
P_D	Power Dissipation ⁴ ($T_A = 25^\circ\text{C}$)	3.8	W
	Power Dissipation ⁴ ($T_A = 75^\circ\text{C}$)	2.5	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

Thermal Resistance Ratings			
Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ¹	62.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Maximum Junction-to-Case ¹	2.1	$^\circ\text{C/W}$

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	1.5	-	4	V
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	150	-	-	V
g_{fs}	Forward Transconductance	$V_{DS} = 10\text{V}$, $I_D = 5\text{A}$	-	25	-	S
I_{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 55^\circ\text{C}$	-	-	10	μA
$R_{DS(on)}$	Drain-Source On-Resistance ²	$V_{GS} = 10\text{V}$, $I_D = 10\text{A}$	-	-	60	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}$, $I_D = 4.5\text{A}$	-	-	70	$\text{m}\Omega$
E_{AS}	Single Pulse Avalanche Energy ⁵	$V_{DD} = 25\text{V}$, $L = 0.1\text{mH}$, $I_{AS} = 10\text{A}$	5	-	-	mJ
V_{SD}	Diode Forward Voltage ²	$I_S = 1\text{A}$, $V_{GS} = 0$, $T_J = 25^\circ\text{C}$	-	-	1.2	V
I_S	Continuous Source Current ^{1,6}	$V_G = V_D = 0\text{V}$, Force Current	-	-	20	A

Notes

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. The EAS data shows maximum rating. The test condition is $V_{DD} = 25\text{V}$, $V_{GS} = 10\text{V}$, $L = 0.1\text{mH}$, $I_{AS} = 18\text{A}$
4. The power dissipation is limited by 150°C junction temperature.
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

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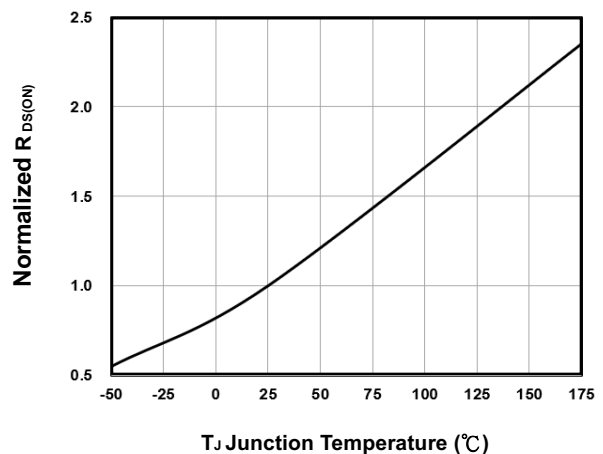
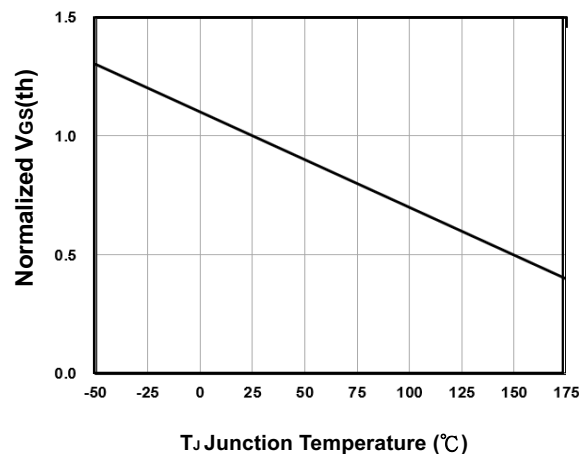
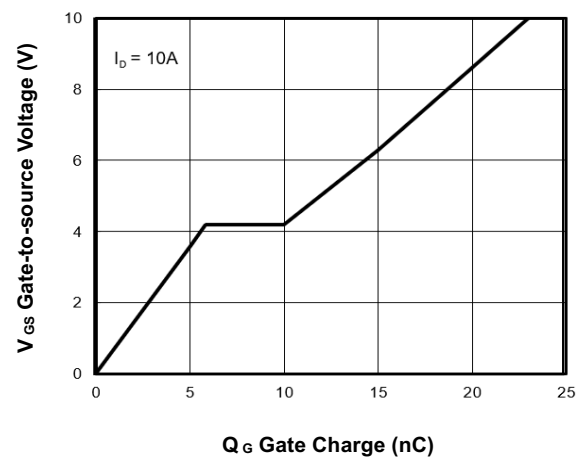
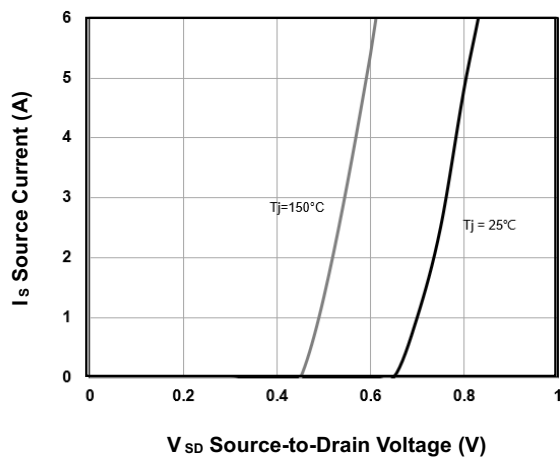
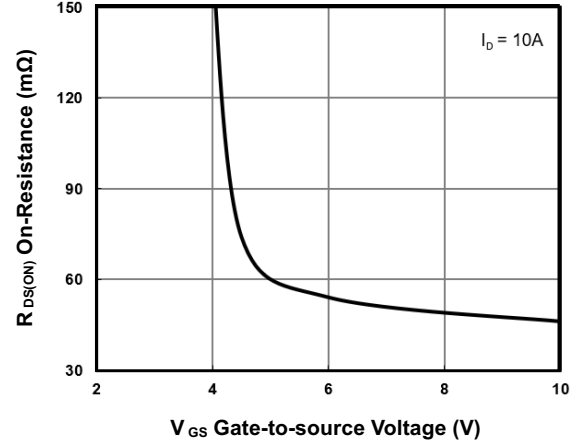
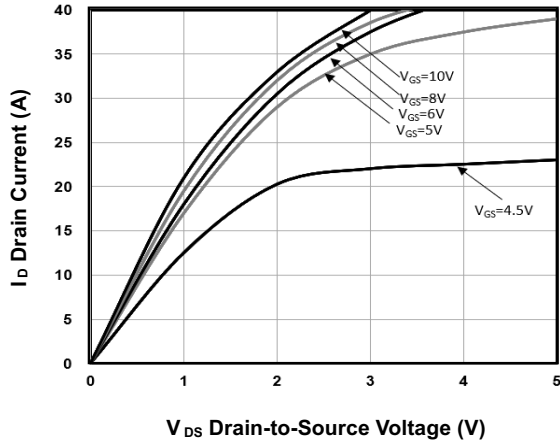
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Dynamic						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Q_g	Total Gate Charge ²	VDS = 75 V, VGS = 10 V, ID = 10 A	--	23	--	nC
Q_{gs}	Gate-Source Charge		--	5.8	--	
Q_{gd}	Gate-Drain ("Miller") Charge		--	4.2	--	
$t_{d(on)}$	Turn-On Delay Time ²	VDS = 75 V, ID = 10 A, VGS = 10 V, RG = 3.3 Ω	--	16.2	--	ns
t_r	Rise Time		--	18.6	--	
$t_{d(off)}$	Turn-Off Delay Time		--	28.5	--	
t_f	Fall Time		--	6.5	--	
C_{iss}	Input Capacitance	VDS = 75 V, VGS = 0 V, f = 1 Mhz	--	1190	--	pF
C_{oss}	Output Capacitance		--	73	--	
C_{rss}	Reverse Transfer Capacitance		--	4	--	

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- Typical Electrical Characteristics



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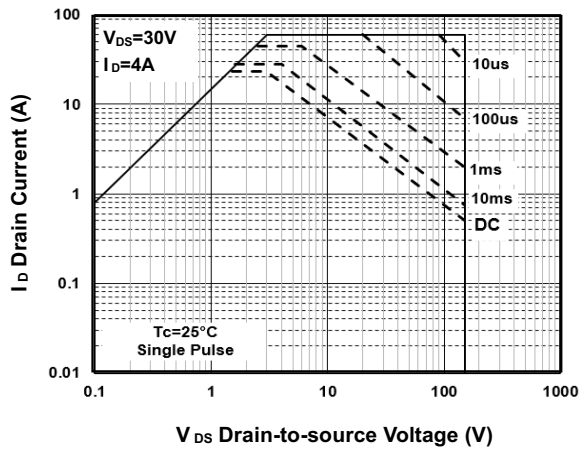


FIG.7- Safe Operating Area

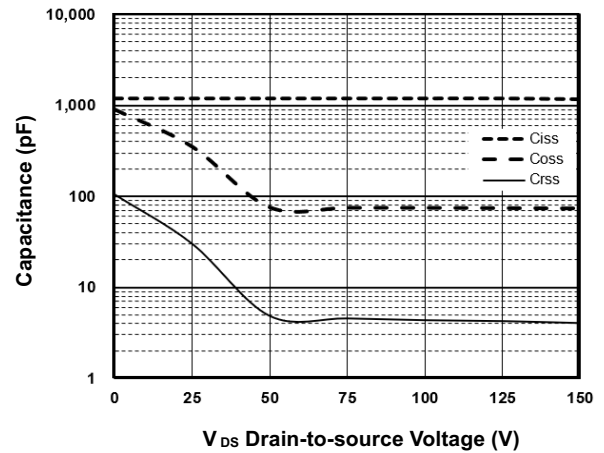


FIG.8-Capacitance Characteristics

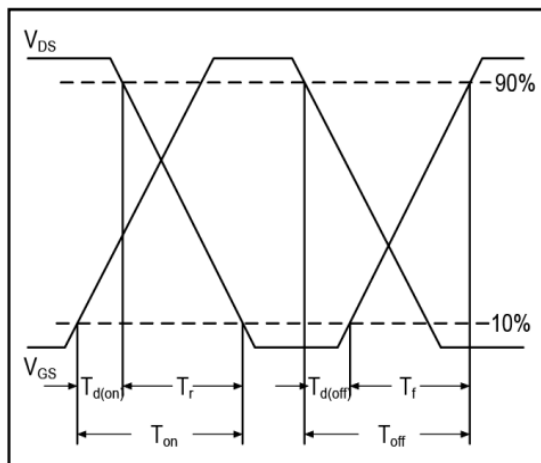


FIG.9- Switching Time Waveform

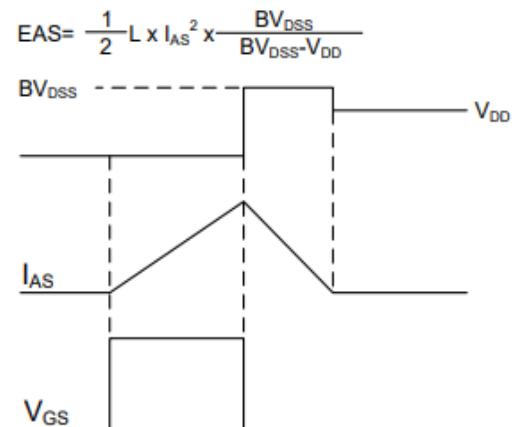


FIG.10- Unclamped Inductive Switching Waveform

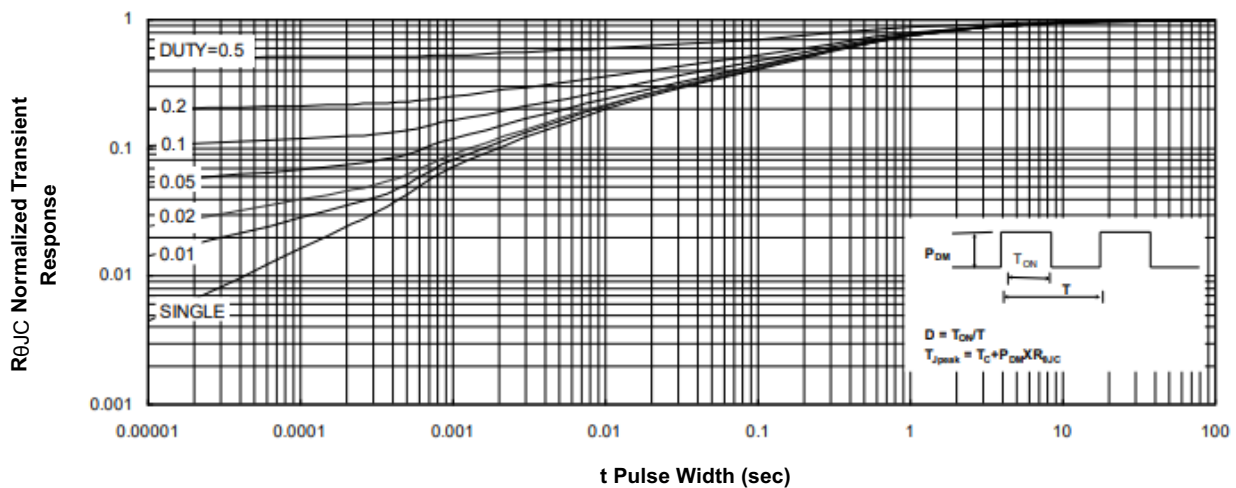


FIG.11-Normalized Maximum Transient Thermal Impedance

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